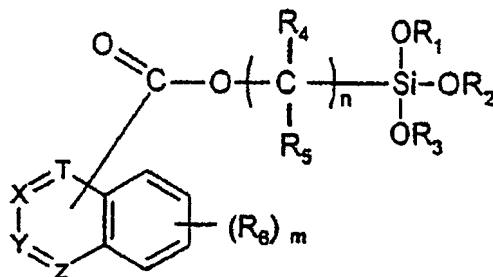


Claims

1. (Currently Amended) A method Method for the preparation of a silyl alkyl ester having the Formula (I)



(I)

in which

R_1 , R_2 , and R_3 are equal or different and represent alkyl, aryl and heteroaryl,

R_4 and R_5 are equal or different and represent hydrogen, halogen, alkyl, aryl and heteroaryl,

n is an integer from 1 to 10,

R_6 is a substituent selected from halogen, alkyl, aryl, heteroaryl, hydroxy, alkoxy, aryloxy, substituted and unsubstituted amino group, carboxy group, carboxylic acid ester group, carboxylic acid amide group, sulfonic acid group, sulfonic acid ester group, sulfonyl, thio, thioether and nitro,

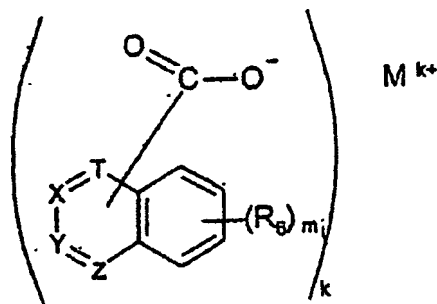
m is an integer from 0 to 4,

T, X, Y and Z each represent carbon,

a benzo group, which is m -fold substituted with R_6 or which is unsubstituted, is condensed on one of the bonds T-X, X-Y or Y-Z to form a trinuclear aromatic ring system,

wherein the silyl alkyl ester group is substituted at the middle ring of said trinuclear aromatic ring system,

wherein a carboxylic acid salt of Formula (II)

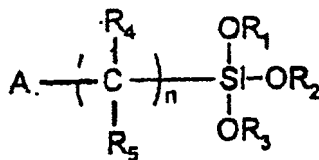


(II)

in which k is an integer from 1 to 4 and M is a metal,

is reacted with an organosilicon compound of

Formula (III)

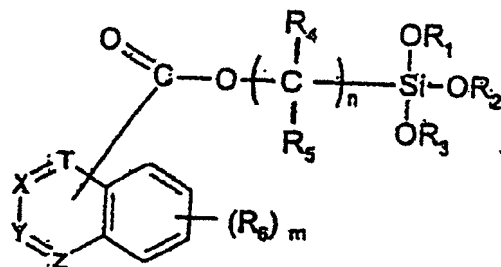


(III)

in which A represents a nucleofugal leaving group.

2. (Currently Amended) The Method method according to Claim 1, wherein the metal M is selected from the groups Ia, IIa, IIIa, IVa, Ib, IIb, IVb and VIIIb of the periodic table.
3. (Currently Amended) The Method method according to Claim 1-or-2, wherein k = 1.
4. (Currently Amended) The Method method according to any one of Claims 1 to 3 claim 2, wherein M is selected from metals of Group Ia.

5. (Currently Amended) The Method method according to any one of Claims 1 to 4 claim 4 wherein the metal M is selected from lithium, sodium and potassium.
6. (Currently Amended) The Method method according to any one of Claims 1 to 5 claim 5 wherein the metal M is sodium ~~and/or~~ or potassium ~~and particularly potassium~~.
7. (Currently Amended) The Method method according to any one of Claims 1 to 6 claim 1 wherein the nucleofugal leaving group A comprises halogen. ~~represents halogen; preferably chlorine and/or bromine and yet more preferably chlorine.~~
8. (Currently Amended) The Method method according to any one of Claims 1 to 7 claim 1 wherein the carboxylic acid salt of Formula (II) is reacted with the organosilicon compound of Formula (III) in a solvent or solvent mixture, from which the metal salt of the formula MA_x formed is precipitated.
9. (Currently Amended) The Method method according to Claim 8, wherein ~~[[as]]~~ a solvent or solvent mixture~~[[,]]~~ comprising N,N-dimethylformamide, ~~and/or~~ N,N-dimethylacetamide or a mixture thereof is used.
10. (Currently Amended) A Silyl alkyl ester having the formula (I)



(I)

wherein

R_1 , R_2 , and R_3 are equal or different and represent alkyl, aryl and heteroaryl,

R_4 and R_5 each represent hydrogen,

n is an integer from 3 to 5,

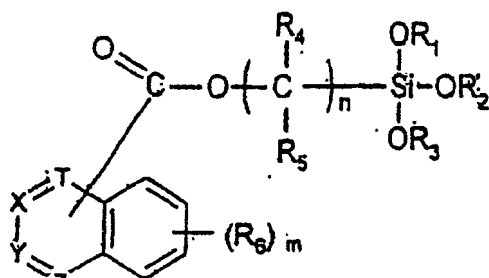
R₆ is a substituent selected from halogen, alkyl, aryl, heteroaryl, hydroxy, alkoxy, ary-lether, substituted and unsubstituted amino group, carboxy group, carboxylic acid ester group, carboxylic acid amide group, sulfonic acid group, sulfonic acid ester group, sul-fonyl, thio, thioether and nitro,

m is an integer from 0 to 4,

T, X, Y and Z each represent carbon,

a benzo group, which is substituted m-fold with R₆ or which is unsubstituted, is con-densed on one of the bonds T-X, X-Y or Y-Z to form a trinuclear aromatic ring system, wherein the silyl alkyl ester group is substituted at the middle ring of said trinuclear aromatic ring system.

11. (Currently Amended) The silyl ~~Silyl~~ alkyl ester according to Claim 10, wherein R₁, R₂, and R₃ each represent alkyl.
12. (Currently Amended) The silyl ~~Silyl~~ alkyl ester according to Claim 10 ~~or 11~~, wherein R₁, R₂, and R₃ are selected, independently of one another, from methyl, ethyl, n-propyl, iso-propyl, n-butyl, 2-methylpropyl, 1-methylpropyl and 1,1-dimethylethyl.
13. (Currently Amended) The silyl ~~Silyl~~ alkyl ester according to ~~any one of Claims 10 to 12~~ claim 12, wherein R₁, R₂, and R₃ each represent methyl or ethyl.
14. (Currently Amended) The silyl ~~Silyl~~ alkyl ester according to ~~any one of Claims 10 to 13~~ claim 10, wherein a benzo group, which is m-fold substituted with R₆ or which is un-substituted, is condensed on the X-Y bond.
15. (Currently Amended) The silyl ~~Silyl~~ alkyl ester according to Claim 14, wherein an un-substituted benzo group is condensed on the X-Y bond and m=0.
16. (Currently Amended) The silyl ~~Silyl~~ alkyl ester according to ~~any one of Claims 10 to 13~~ claim 10, wherein a benzo group, which is m-fold substituted with R₆ or which is un-substituted, is condensed on either the T-X or Y-Z bond.
17. (Currently Amended) The silyl ~~Silyl~~ alkyl ester according to Claim 16, wherein an un-substituted benzo group is condensed on either the T-X or Y-Z bond and m=0.
18. (Currently Amended) A Silyl alkyl ester having the formula (I)



(I)

wherein

R_1 , R_2 , and R_3 are equal or different and represent alkyl, aryl and heteroaryl,

R_4 and R_5 are equal or different and represent hydrogen, halogen, alkyl, aryl and heteroaryl,

n is an integer from 1 to 10,

R_6 is a substituent selected from halogen, alkyl, aryl, heteroaryl, hydroxy, alkoxy, ary-lether, substituted and unsubstituted amino group, carboxy group, carboxylic acid ester group, carboxylic acid amide group, sulfonic acid group, sulfonic acid ester group, sul-fonyl, thio, thioether and nitro,

m is an integer from 0 to 4,

T , X , Y and Z each represent carbon,

a benzo group, which is substituted m -fold with R_6 or which is unsubstituted, is con-densed on either the $T-X$ or $Y-Z$ bond to form a trinuclear aromatic ring system, wherein the silyl alkyl ester group is substituted at the middle ring of said trinuclear aromatic ring system.

19. (Currently Amended) The silyl Silyl alkyl ester according to Claim 18, wherein R_1 , R_2 , and R_3 each represent alkyl.

20. (Currently Amended) The silyl Silyl alkyl ester according to Claim 18 ~~or 19~~, wherein R₁, R₂, and R₃ are selected, independently of one another, from methyl, ethyl, n-propyl, iso-propyl, n-butyl, 2-methylpropyl, 1-methylpropyl and 1,1-dimethylethyl.
21. (Currently Amended) The silyl Silyl alkyl ester according to ~~any one of Claims 18 to 20~~ claim 20, wherein R₁, R₂, and R₃ each represent methyl or ethyl.
22. (Currently Amended) The silyl Silyl alkyl ester according to ~~any one of Claims 18 to 21~~ claim 18, wherein R₄ and R₅ each represent hydrogen.
23. (Currently Amended) The silyl Silyl alkyl ester according to ~~any one of Claims 18 to 22~~ claim 18, wherein n is an integer from 1 to 5, ~~particularly from 1 to 3, yet more preferably 1 or 3 and most preferably 3.~~
24. (Currently Amended) The silyl Silyl alkyl ester according to ~~any one of Claims 18 to 23~~ claim 18, wherein an unsubstituted benzo group is condensed on either the T-X or Y-Z bond and m=0.
25. (Currently Amended) A composition ~~Composition~~ which comprises at least one silyl alkyl ester according to claim 10 or 18 ~~any one of Claims 10 to 24~~ and at least one further reactive silane.
26. (Currently Amended) A composition ~~Composition~~ according to Claim 25, wherein the reactive silane is selected from alkoxysilanes and halogen silanes, ~~particularly chlorosilanes.~~
27. (Currently Amended) A composition ~~Composition~~ according to Claim 25 ~~or 26~~, wherein the reactive silane ~~is selected from~~ comprises triethoxysilane (HTEOS), tetraethoxysilane (TEOS), methyltriethoxysilane (MTEOS), dimethyldiethoxysilane, tetramethoxysilane (TMOS), methyltrimethoxysilane (MTMOS), trimethoxysilane, dimethyldimethoxysilane, phenyltriethoxysilane (PTEOS), phenyltrimethoxysilane (PTMOS), diphenyldiethoxysilane, diphenyldimethoxysilane, trichlorosilane, methyltrichlorosilane, ethyltrichlorosilane, phenyltrichlorosilane, tetrachlorosilane, dichlorosilane, methyldichlorosilane, dimethyldichlorosilane, chlorotriethoxysilane, chlorotrimethoxysilane, chloromethyltriethoxysilane, chloroethyltriethoxysilane, chlorophenyltriethoxysilane, chloromethyltrimethoxysilane, chloroethyltrimethoxysilane and chlorophenyltrimethoxysilane.

28. (Currently Amended) A composition ~~Composition~~ according to ~~any one of Claims 25 to 27~~ claim 27, wherein the reactive silane is selected from triethoxysilane (HTEOS), tetraethoxysilane (TEOS), methyltriethoxysilane (MTEOS), tetramethoxysilane (TMOS), methyltrimethoxysilane (MTMOS), phenyltriethoxysilane (PEOS) and phenyltrimethoxysilane (PTMOS).
29. (Currently Amended) A composition ~~Composition~~ according to ~~any one of Claims 25 to 28~~ claim 25, which comprises a solvent or solvent mixture.
30. (Currently Amended) A composition ~~Composition~~ according to Claim 29, wherein the solvent or solvent mixture comprises at least one component selected from water, linear or branched alkyl alcohol having 1 to 6 carbon atoms, linear or branched ketone having 1 to 6 carbon atoms, linear or branched carboxylic acid ester having 1 to 6 carbon atoms ~~and or~~ linear or branched carboxylic acid amide having 1 to 6 carbon atoms.
31. (Currently Amended) A composition ~~Composition~~ according to Claim 29 ~~or 30~~, wherein the solvent or solvent mixture comprises at least one component selected from water, acetone, 1-propanol, 2-propanol, butanol, methylisobutylketone, methoxypropanol, propoxypropanol, ethyl acetate and propyl acetate.
32. (Currently Amended) A composition ~~Composition~~ according to ~~any one of Claims 25 to 31~~ claim 25, which comprises an aqueous solution of at least one protonic acid ~~and/or or~~ an aqueous solution of at least one acid anhydride.
33. (Currently Amended) A composition ~~Composition~~ according to Claim 32, wherein the protonic acid is nitric acid.
34. (Currently Amended) A method ~~Method~~ for the preparation of a polysiloxane composition, wherein a composition according to ~~any one of Claims 25 to 33~~ claim 25 is provided and the silyl alkyl ester is condensed with the reactive silane.
35. (Currently Amended) The method ~~Method~~ according to Claim 34, wherein the condensation of the silyl alkyl ester with the reactive silane is carried out by heating.
36. (Currently Amended) The method ~~Method~~ according to Claim 35, wherein the composition is heated for 1 to 24 hours, ~~more preferably for 1 to 10 hours and yet more preferably for 2 to 6 hours~~ at a temperature of 20 to 100°C, ~~more preferably from 40 to 80°C and yet more preferably from 60 to 80°C.~~

37. (Currently Amended) The method ~~Method~~ according to ~~any one of Claims 34 to 36~~ claim 34, wherein during the condensation, polysiloxane having a low molecular weight and degree of cross-linking is formed, which is dissolved or suspended in the solvent or solvent mixture.
38. (Currently Amended) The method ~~Method~~ according to ~~any one of Claims 34 to 37~~ claim 34, wherein during or after the condensation, a diluting solvent is added.
39. (Currently Amended) The method ~~Method~~ according to Claim 38, wherein the diluting solvent comprises at least one component selected from methanol, ethanol, 2-propanol, butanol, acetone, propyl acetate, ethyl lactate, propylene glycol propyl ether, diacetone alcohol and methoxypropanol.
40. (Currently Amended) A polysiloxane ~~Polysiloxane~~ composition, ~~which is obtainable by a method as defined in any one of Claims 34 to 39~~ formed by the method of claim 34.
41. (Currently Amended) A coated ~~Coated~~ substrate, ~~which is obtainable by a method comprising~~ formed by applying the composition as ~~defined in any one of claim 25~~ defined in ~~claims 25 to 33~~ claim 25 or the polysiloxane composition ~~as defined in~~ of claim 40 to the substrate; and
heating the substrate with the composition or polysiloxane composition applied thereon.
42. (Currently Amended) A coated ~~Coated~~ substrate according to claim 41, wherein applying of said composition or said polysiloxane composition is performed by ~~means of~~ spin techniques.
43. (Currently Amended) A coated ~~Coated~~ substrate according to claim 41 ~~or 42~~, wherein the substrate is selected from a semiconductor device, a silicon-wafer, a glass plate and or a metal plate.
44. (Currently Amended) A use ~~Use~~ of a composition as defined in ~~any one of Claims 25 to 33~~ claim 25 or of a polysiloxane composition ~~as defined in~~ of Claim 40 for the preparation of a coating on a substrate.
45. (Currently Amended) The use ~~Use~~ according to Claim 44, wherein the composition or the polysiloxane composition is applied to the substrate and heating the substrate ~~with said composition or polysiloxane composition applied thereon is heated~~.

46. (Currently Amended) The use ~~Use~~ according to Claim 44 ~~or 45~~, wherein the composition or the polysiloxane composition is applied to the substrate by ~~means of spin techniques~~.
47. (Currently Amended) The use ~~Use~~ according to ~~any one of Claims 44 to 46~~ claim 44, wherein the substrate is a semiconductor device or a silicon wafer.
48. (Currently Amended) A method ~~Method~~ for the photolithographic production of an integrated circuit pattern comprising the steps of:
- (a) ~~radiating a stack through a mask, said stack comprising the lower substrate, an upper photoresist layer, at least one anti-reflective layer formed from the composition as defined in any one of claims 25 to 33 of claim 25 or from the polysiloxane composition as defined in claim 40, and optionally at least one further layer to be structured, each being located between said substrate and said photoresist layer,~~
 - (b) ~~developing the exposed stack to produce openings in said photoresist layer,~~
 - (c) ~~etching a first pattern through said openings in said at least one anti-reflective layer and optionally at least one further layer to be structured, and~~
 - (d) ~~stripping off said photoresist layer, at least one anti-reflective layer and optionally at least one further layer to be structured to produce the integrated circuit pattern.~~
49. (Currently Amended) The method ~~Method~~ according to claim 48, wherein the substrate is a semi-conductor device or a silicon wafer.
50. (Currently Amended) The method ~~Method~~ according to claim 48 ~~or 49~~, wherein in step (a) the stack is radiated with ultraviolet light having a wavelength of less than 260 nm; ~~particularly 193 nm or 248 nm.~~